

WHAT IS CLAIMED IS:

1. A process of preparing a nanocomposite comprised of a functionalized diene-based elastomer and a 2:1 layered clay comprises blending:

5 (A) an aqueous dispersion of a functionalized diene-based elastomer having a Tg in a range of about -120°C to about +10°C and a number average molecular weight in a range of about 1,000 to about 1,000,000 g/mole, wherein said elastomer is selected from copolymers of at least one of isoprene and 1,3-butadiene and copolymers of styrene or alpha methyl styrene with at least one of isoprene and 1,3-butadiene, and

10 (B) a particulate 2:1 multi-layered swellable silicate clay;
wherein:

(1) said elastomer contains one or more functional groups selected from at least one of acid, acid-salt and acid-anhydride groups, wherein said aqueous dispersion has a pH in a range of from about 7.1 to about 14 and wherein
15 said clay contains a non-polymeric salt of a quaternary ammonium ion in the galleries between its layers, or

(2) said elastomer contains one or more functional groups as protonated amine modified epoxide groups, wherein said aqueous dispersion has a pH in a range of about 2.5 to about 6.9 and wherein said clay contains at least
20 one cationically exchangeable ion in the galleries between its layers comprised of at least one of sodium, magnesium, potassium and calcium ions.

2. The process of claim 1 (A) and (B)(1) wherein said clay is selected from at least one of smectite, vermiculite and mica clays.

25 3. The process of claim 1 (A) and (B)(1) wherein said clay is selected from montmorillonite and/or hectorite clays.

4. The process of claim 1 (A) and (B)(2) wherein said clay is selected from
30 at least one of smectite, vermiculite and mica clays.

5. The process of claim 1 (A) and (B)(2) wherein said clay is selected from montmorillonite and/or hectorite clays.

6. The process of claim 1 (A) and (B)(2) wherein said clay contains cationic exchangeable ions in its galleries between its layers comprised of at least one of sodium, magnesium, potassium and calcium ions.

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7. The process of claim 1 (A) and (B)(1) wherein said clay contains a quaternary ammonium salt in the galleries between its layers selected from methyl tallow bis-2-hydroxyethyl ammonium bromide and/or chloride, methyl-tallow bis-2-hydroxyethyl ammonium alkyl sulfates, methyl-tallow bis-2-hydroxyethyl ammonium nitrate, methyl-tallow bis-2-hydroxyethyl ammonium hydroxide, methyl-tallow bis-2-hydroxyethyl ammonium acetate, methyl tallow bis-2-hydroxyethyl ammonium phosphate, dimethyl hydrogenated-tallow (2-ethylhexyl) ammonium halides, dimethyl hydrogenated-tallow (2-ethylhexyl) ammonium alkyl sulfates, dimethyl hydrogenated-tallow (2-ethylhexyl) ammonium nitrate, dimethyl hydrogenated-tallow (2-ethylhexyl) ammonium hydroxide, dimethyl hydrogenated-tallow (2-ethylhexyl) ammonium acetate, dimethyl hydrogenated-tallow (2-ethylhexyl) ammonium phosphate, dimethyl dehydrogenated-tallow ammonium halides, dimethyl dehydrogenated-tallow ammonium alkyl sulfates, dimethyl dehydrogenated-tallow ammonium nitrate, dimethyl dehydrogenated-tallow ammonium hydroxide, dimethyl dehydrogenated-tallow ammonium acetate and dimethyl dehydrogenated-tallow ammonium phosphate.

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8. The process of claim 1 (A) and (B)(1) wherein said clay contains a quaternary ammonium salt in the galleries between its layers selected from methyl-tallow bis-2-hydroxyethyl ammonium bromide and/or chloride.

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9. The process of claim 1 (A) wherein said functionalized elastomer is prepared by emulsion polymerization of monomers selected from 1,3-butadiene or a combination of styrene and 1,3-butadiene together with up to about 10 weight percent of the monomers of one or more additional monomers selected from methacrylic acid, acrylic acid, methacrylic anhydride, mesaconic anhydride, itaconic acid, maleic anhydride, cis-3 bromo acrylic acid, crotonic acid, itaconic anhydride, citraconic acid, citraconic anhydride, fumaric acid, and 2-ethyl acrylic acid.

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FOOTNOTES

10. The process of claim 1 (A) wherein said functionalized elastomer is prepared by incorporating carboxylic functionalities into the elastomer chain wherein said carboxylic acids are selected from one or more of maleic acid, succinic acid, itaconic acid, crotonic acid, acrylic acid and methacrylic acid.

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11. The process of claim 1 (A) and (B)(2) wherein said functionalized elastomer is an epoxidized elastomer, wherein the said epoxy groups are modified by treatment with a primary or secondary amine selected from at least one of methylamine, ethylamine propylamine, butylamine, dimethylamine, diethylamine, dipropylamine, methylbutyl amine and dialkylaminoalkylamines, followed by the protonation thereof by treatment with an acid selected from boric acid, formic acid, lactic acid, propionic acid, butyric acid, hydrochloric acid, phosphoric acid, sulfuric acid, carbonic acid and acetic acid.

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12. The process of claim 1 (A) and (B)(2) wherein said functionalized elastomer is an epoxidized elastomer, wherein the said epoxy groups are modified by treatment with a salt of tertiary amine.

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13. The process of claim 11 wherein said epoxidized elastomer is selected from epoxidized natural cis 1,4-polyisoprene elastomer, epoxidized-polybutadiene or styrene-butadiene-glycidyl methacrylate terpolymer.

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14. The process of claim 1 (A) and (B)(1) wherein said pH is in a range of about 7.1 to about 8 or of claim 1 (A) and (B)(2) wherein said pH is in a range of about 3.5 to about 5.

15. A nanocomposite prepared according to the process of claim 1.

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16. A rubber composite as a blend of said nanocomposite of claim 1 and at least one additional diene-based elastomer.

17. A rubber composite as a blend of said nanocomposite of claim 1 and at least one additional diene-based elastomer, additional particulate reinforcing agent

and/or coupling agent.

18. An article of manufacture is having at least one component comprised of said nanocomposite and/or said rubber composite.

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19. A tire having at least one component comprised of said nanocomposite and/or said rubber composite.

20. The tire of claim 6 wherein said tire component is selected from at least one of a tire tread, tire innerliner and/or tire sidewall.

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FOOTNOTES